CLAIMS

1. A method of compensating a data writing process in an optical disc data storage channel, the method comprising:

deriving a write strategy matrix wherein the write strategy matrix maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements;

receiving an input sequence; and

using the write strategy matrix to determine a selected write strategy parameter that corresponds to the input sequence.

2. A method of compensating as recited in claim 1 wherein the write strategy parameters are configured to control the time course of writing laser pulses.

3. A method of compensating as recited in claim 1 wherein the optical disc is an optical phase change disc.

4. A method of compensating as recited in claim 1 wherein each input sequence corresponds to a set of write strategy parameters.

5. A method of compensating as recited in claim 1 wherein the input sequence consists of three data elements.

6. A method of compensating as recited in claim 1 wherein the write strategy matrix is derived so that detected signal transitions in the output from the optical disc data storage channel are adjusted to occur at desired points in time.

7. A method of improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, the method comprising:

writing a set of input sequences to an optical data storage channel using the write strategy matrix;

transforming the set of input sequences using a target channel model to obtain transformed data;

recovering output data from the optical data storage channel;

comparing the recovered output data to the transformed input data to determine a difference between the recovered output data and the transformed input data; and

adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data.

8. A method of compensating as recited in claim 1 wherein the write strategy matrix is derived so that detected signal levels adjusted.

9. A method of improving a write strategy matrix as recited in claim 7 wherein the target channel model is a fixed channel model.

10. A method of improving a write strategy matrix as recited in claim 7 wherein the target channel model is a dynamic channel model.

11. A method of improving a write strategy matrix as recited in claim 7 wherein the target channel model is a linear channel model.

12. A method of improving a write strategy matrix as recited in claim 7 wherein the target channel model is a linear dynamic channel model.

13. A method of improving a write strategy matrix as recited in claim 7 further including adjusting the target channel model to increase the similarity of the transformed input data to the recovered output data.

14. A method of improving a write strategy matrix as recited in claim 7 wherein adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data includes adjusting the write strategy matrix by a fixed amount.

15. A method of improving a write strategy matrix as recited in claim 7 wherein adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data includes adjusting the write strategy matrix by an amount that is determined by the difference between the recovered output data and the transformed input data.

16. A method of improving a write strategy matrix as recited in claim 7 wherein adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data includes adjusting the write strategy matrix by a plurality of amounts and determining which of the plurality of amounts decreases the

difference between the recovered output data and the transformed input data most effectively.

17. A method of improving a write strategy matrix as recited in claim 7 wherein adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data includes adjusting the write strategy matrix by a plurality of amounts and determining which of the plurality of amounts decreases the difference between the recovered output data and the transformed input data by the greatest amount.

18. A method of deriving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, the method comprising:

writing a first input sequence to an optical data storage channel;

recovering a first sequence of output data from the optical data storage channel;

using the first sequence of output data to map the plurality of data elements to a plurality of initial write strategy parameters;

writing a second input sequence to the optical data storage channel using the initial write strategy parameters, the second input sequence including a plurality of subsequences;

recovering a second sequence of output data from the optical data storage channel;

using the second sequence of output data to map the plurality of subsequences to the plurality of write strategy parameters.

19. A method of deriving a write strategy matrix as recited in claim 18 wherein the first input sequence is configured to determine the dynamic range of the optical data storage channel and wherein the plurality of initial write strategy parameters are configured to use less than the entire dynamic range of the optical data storage channel.

20. A method of deriving a write strategy matrix as recited in claim 18 wherein the first sequence is configured to control intersymbol interference.

21. A method of deriving a write strategy matrix as recited in claim 18 wherein the first sequence includes a series of repeated symbols.

22. A method of deriving a write strategy matrix as recited in claim 18 wherein the plurality of subsequences have a given length and wherein the plurality of subsequences include all possible subsequences of the given length.

23. A method of deriving a write strategy matrix as recited in claim 22 wherein the given length is three.

24. A method of deriving a write strategy matrix as recited in claim 18 wherein the plurality of subsequences have a given length and wherein the second sequence include all possible subsequences of a length that is greater than the given length.

25. A method of deriving a write strategy matrix as recited in claim 24 wherein the given length is three and the length that is greater than the given length is five.

26. A method of deriving a write strategy matrix as recited in claim 18 wherein the initial write strategy parameters are derived such that three or more output levels corresponding to the input data elements are evenly spaced.

27. A method of deriving a write strategy matrix as recited in claim 18 wherein the initial write strategy parameters are derived such that three or more output levels corresponding to the input data elements are spaced based on the variance of the distribution of the output data in the first sequence of output data about the output levels.

28. A method of deriving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, comprising:

writing an input sequence to an optical data storage channel, the input sequence including a plurality of subsequences;

recovering a sequence of output data from the optical data storage channel;

using the sequence of output data to map the plurality of subsequences to the plurality of write strategy parameters.

29. A method of deriving a write strategy matrix as recited in claim 28 wherein the plurality of subsequences have a given length and wherein the plurality of subsequences include all possible subsequences of the given length.

30. A method of deriving a write strategy matrix as recited in claim 28 wherein the plurality of subsequences have a given length and wherein the input sequence includes all possible subsequences of a length that is greater than the given length.

31. A method of improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, comprising:

transforming the set of input sequences using a target channel model to obtain a first set of transformed data;

transforming the set of input sequences using a simulated channel model to obtain a second set of transformed data

comparing the first set of transformed data to the second set of transformed data to determine a difference between the first set of transformed data to the second set of transformed data; and

adjusting the write strategy matrix to decrease the difference between the first set of transformed data to the second set of transformed data.

32. A method of improving a write strategy matrix as recited in claim 31 wherein the simulated channel model is obtained by writing a set of input sequences to an optical data storage channel using the write strategy matrix and recovering output data from the optical data storage channel.

33. A method of improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, the method comprising:

writing a set of input sequences to an optical data storage channel using the write strategy matrix;

transforming the set of input sequences using a target channel model to obtain transformed data;

recovering output data from the optical data storage channel;

comparing the recovered output data to the transformed input data to determine a difference between the recovered output data and the transformed input data; and

adjusting the write strategy matrix to decrease the difference between the recovered output data and the transformed input data.

34. A system for compensating a data writing process in an optical disc data storage channel, the system comprising:

a data input for receiving an input sequences;

a write strategy matrix wherein the write strategy matrix maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements; and

an output for outputting a selected write strategy parameter that corresponds to the input sequence.

35. A system as recited in claim 34 wherein the write strategy parameters are configured to control the time course of writing laser pulses.

36. A system as recited in claim 34 wherein the optical disc is an optical phase change disc.

37. A system as recited in claim 34 wherein each input sequence corresponds to a set of write strategy parameters.

38. A system as recited in claim 34 wherein the input sequence consists of three data elements..

39. A system as recited in claim 34 wherein the write strategy matrix is derived so that detected signal transitions in the output from the optical disc data storage channel are adjusted to occur at desired points in time.

40. A system as recited in claim 34 wherein the write strategy matrix is derived so that detected signal levels in the output from the optical disc data storage channel are adjusted.

41. A system for improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, the system comprising:

a writer configured to write a set of input sequences to an optical data storage channel using the write strategy matrix;

a target channel model for transforming the set of input sequences to obtain transformed data;

a reader configured to recover output data from the optical data storage channel; and

a processor configured to comparing the recovered output data to the transformed input data to determine a difference between the recovered output data and the transformed input data and adjust the write strategy matrix to decrease the difference between the recovered output data and the transformed input data.

42. A system as recited in claim 41 wherein the target channel model is a fixed channel model.

43. A system as recited in claim 41 wherein the target channel model is a dynamic channel model.

44. A system as recited in claim 41 wherein the target channel model is a linear channel model.

45. A system as recited in claim 41 wherein the target channel model is a linear dynamic channel model.

46. A system as recited in claim 41 further including a second processor configured to adjust the target channel model to increase the similarity of the transformed input data to the recovered output data.

47. A system as recited in claim 41 wherein the first processor is further configured to adjust the target channel model to increase the similarity of the transformed input data to the recovered output data.

48. A system as recited in claim 41 wherein the write strategy matrix is adjusted by a fixed amount.

49. A system as recited in claim 41 wherein the write strategy matrix is adjusted by an amount that is determined by the difference between the recovered output data and the transformed input data.

50. A system as recited in claim 41 wherein the write strategy matrix is adjusted by a plurality of amounts and it is determined which of the plurality of amounts decreases the

difference between the recovered output data and the transformed input data most effectively.

51. A system as recited in claim 41 wherein the write strategy matrix is adjusted by a plurality of amounts and it is determined which of the plurality of amounts decreases the difference between the recovered output data and the transformed input data by the greatest amount.

52. A system for deriving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, comprising:

a writer configured to writing an input sequence to an optical data storage channel, the input sequence including a plurality of subsequences;

a reader configured to for recovering a sequence of output data from the optical data storage channel; and

a processor for using the sequence of output data to map the plurality of subsequences to the plurality of write strategy parameters.

53. A system as recited in claim 52 wherein the plurality of subsequences have a given length and wherein the plurality of subsequences include all possible subsequences of the given length.

54. A system as recited in claim 52 wherein the plurality of subsequences have a given length and wherein the input sequence includes all possible subsequences of a length that is greater than the given length.

55. A system for improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, the system comprising:

an input configured to receiving a set of input sequences;

a processor configured to:

transform the set of input sequences using a target channel model to obtain a first set of transformed data;

transform the set of input sequences using a simulated channel model to obtain a second set of transformed data

compare the first set of transformed data to the second set of transformed data to determine a difference between the first set of transformed data to the second set of transformed data; and

adjust the write strategy matrix to decrease the difference between the first set of transformed data and the second set of transformed data.

56. A system as recited in claim 55 wherein the simulated channel model is obtained by writing a set of input sequences to an optical data storage channel using the write strategy matrix and recovering output data from the optical data storage channel.

57. A system for improving a write strategy matrix that maps a plurality of input sequences to a plurality of write strategy parameters, the input sequences each including a plurality of input data elements, comprising:

a writer configured to write a set of input sequences to an optical data storage channel using the write strategy matrix;

a reader configured to recover output data from the optical data storage channel; and

a processor configured to transform the set of input sequences using a target channel model to obtain transformed data, to compare the recovered output data to the transformed input data, to determine a difference between the recovered output data and the transformed input data and to adjust the write strategy matrix to decrease the difference between the recovered output data and the transformed input data.